

AIR QUALITY ASSESSMENT
THUNDER BAY TERMINALS LIMITED
THUNDER BAY
1984

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TECHNICAL SUPPORT SECTION
NORTHWESTERN REGION
ONTARIO MINISTRY OF THE ENVIRONMENT
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INTRODUCTION

Since 1978, Thunder Bay Terminals Limited has operated a bulk storage and trans-shipment facility adjacent to Thunder Bay harbour. Air quality studies (including air monitoring, vegetation, soil and snow sampling) have shown that there has been no increase in dust levels off company property resulting from operations at the terminal. Originally, the terminal was intended to handle only coal. In recent years, there has been some diversification in types of materials passing through this facility. In 1984, for example, there were just over 5 million tons of throughput, comprising about 4 million tons of coal, 1¼ million tons of potash, and a small amount of agricultural products (rapeseed, barley, and sunflower seed).

AIR QUALITY DATA

DUSTFALL

In 1984, dustfall was measured at monthly frequencies at the six sites shown in Figure 1. Thunder Bay Terminals collected data at sites 1, 3, 6 and 7, while sites 9 and 10 were part of the Ministry's monitoring network.

During the year, monthly dustfall never exceeded Ontario's maximum acceptable limit of 7 g/m²/30 d (grams of total dustfall per square metre during 30 days) at any of the three off-property monitoring sites (Table 1). Annual average dustfall at these same locations also met the provincial objective (4.6 g/m²). Dustfall at one of the three on-property measurement locations (site 7) also met the annual objective, and one of the other two on-property sites (site 3) was only slightly above. Site 7 had two very high readings in the summer, both of which were caused by biological material (e.g. insect parts). The elevated reading at site 6 in January was ascribed to road dust and coal dust.

At the three off-property sites (1, 9, and 10), total dustfall in 1984 continued to be recorded at the same low levels found in preceding years (Table 2).

TOTAL SUSPENDED PARTICULATE MATTER (TSP)

Particles of suspended particulate matter, being much smaller than dustfall particles, are suspended in the air for long periods. TSP at Thunder Bay Terminals was measured for a 24-hour period every sixth day during 1984, using a standard high-volume sampler. Table 3 shows that during 1984, TSP met the annual objective ($60 \mu\text{g}/\text{m}^3$) at all monitoring sites. There were three or four exceedences of the daily objective ($120 \mu\text{g}/\text{m}^3$) at each of the off-property locations (sites 1 and 10), and nine exceedences on company property (site 3). While the annual average TSP at the three sites was a little higher in 1984 than that in preceding years (Table 4), the increase was not significant.

CONCLUSION

Dust levels, measured as dustfall and total suspended particulate matter, continued to be recorded at acceptable concentrations around Thunder Bay Terminals property in 1984. Monitoring is being continued to ensure compliance with provincial air quality objectives.

ACKNOWLEDGEMENT

The Ministry thanks Thunder Bay Terminals Limited for providing data on wind, dustfall, and TSP from its monitoring network.

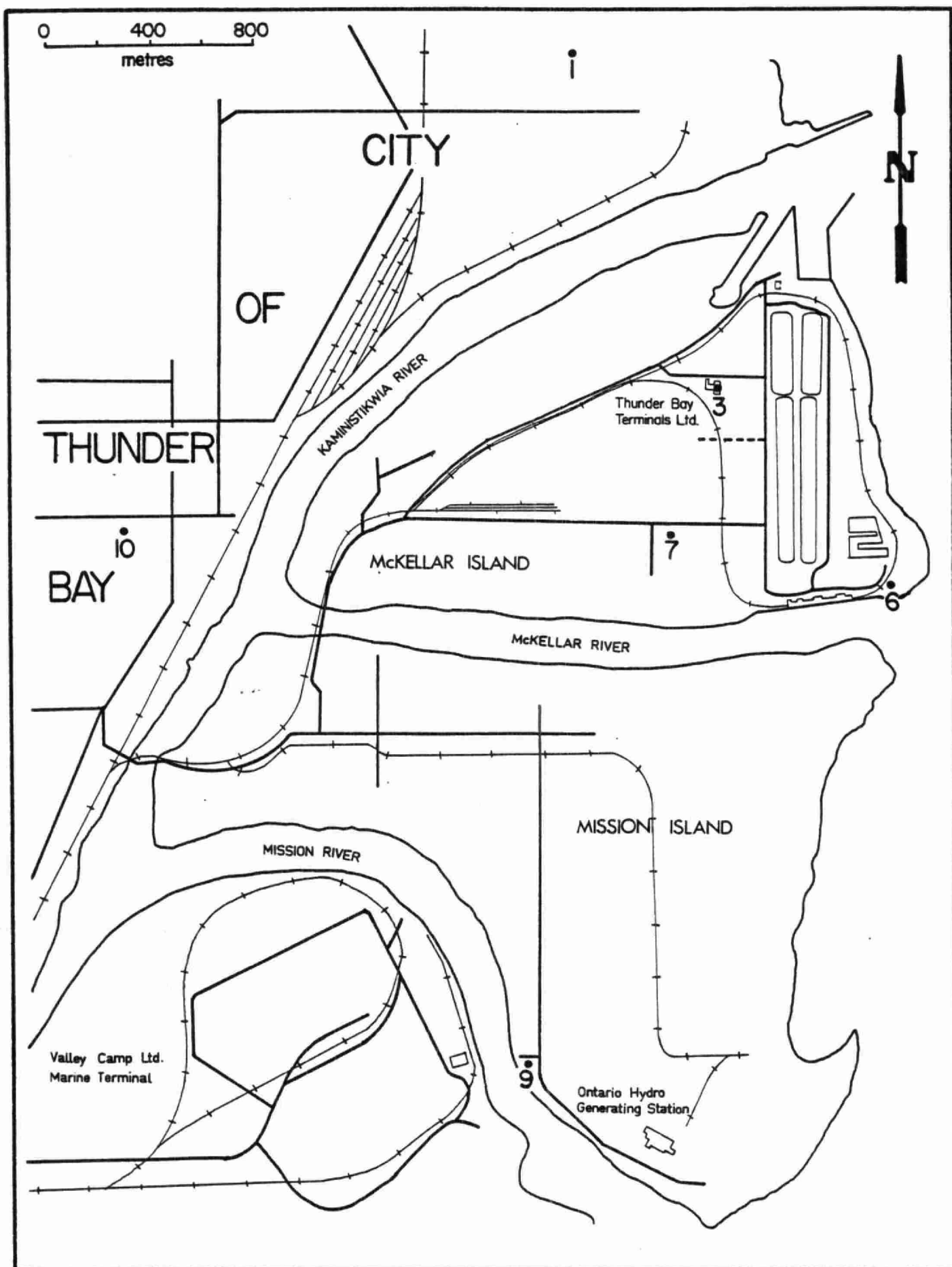


Figure 1. Air quality monitoring sites, 1984.

TABLE 1. Total dustfall (g/m²/30 days) near Thunder Bay Terminals Limited, 1984.

Site	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1	Sewage Treatment Plant	0.7	1.9	2.6	5.1	4.1	6.5	6.9	4.0	4.1	1.9	3.0	3.1	3.6
3	Thunder Bay Terminals	1.0	3.8	2.1	5.0	5.8	<u>10.0</u>	5.5	5.8	5.5	<u>7.2</u>	4.5	3.3	<u>5.0</u>
6	Thunder Bay Terminals	<u>16.9</u>	0.7	4.1	4.2	<u>8.2</u>	<u>8.2</u>	<u>35.2</u>	<u>80.8</u>	<u>9.1</u>	<u>11.4</u>	3.4	1.9	<u>15.3</u>
7	Thunder Bay Terminals	2.8	1.3	2.1	4.8	3.8	<u>7.2</u>	<u>13.0</u>	2.9	4.1	2.8	1.7	1.6	4.0
9	Kam Boating Club	1.0	0.6	1.3	2.3	3.8	2.4	2.9	2.2	-	2.2	2.5	2.2	2.1
10	McKellar Hospital	1.6	2.4	5.0	4.3	5.5	4.4	4.2	4.3	1.7	2.8	3.0	1.7	3.4

^aValues exceeding maximum acceptable levels of 7.0 (monthly) or 4.6 (annual mean) are underlined.

TABLE 2. Average annual dustfall (g/m²/30 d) near Thunder Bay Terminals Limited, 1976-1984.

Monitoring site	Location	1976	1977	1978	1979	1980	1981	1982	1983	1984
1	Sewage Treatment Plant	3.2	4.4	3.2	2.8	2.5	2.1	2.8	3.4	3.6
3	Thunder Bay Terminals	4.2	4.2	2.7	2.7	<u>5.2</u> ^a	3.6	<u>4.7</u>	<u>8.2</u>	<u>5.0</u>
6	Thunder Bay Terminals					<u>8.5</u>	<u>6.9</u>	<u>8.8</u>	<u>19.5</u>	<u>15.3</u>
7	Thunder Bay Terminals					<u>7.9</u>	4.3	3.2	<u>16.1</u>	4.0
9	Kam Boating Club	<u>5.6</u>	4.6	4.3	4.2	2.5	2.1	3.4	1.7	2.1
10	McKellar Hospital	3.5	<u>5.0</u>	3.8	3.8	4.0	3.7	3.8	3.1	3.4

^aValues above maximum acceptable level of 4.6 are underlined.

TABLE 3. Concentrations of total suspended particulate matter ($\mu\text{g}/\text{m}^3$) near Thunder Bay Terminals Limited, 1984.

Date	Monitoring sites			Date	Monitoring sites		
	1	3	10		1	3	10
Jan 1	44	31	37	Jul 5	28	39	28
7	37	51	-	11	56	83	44
13	10	29	19	17	32	36	21
19	88	29	27	23	31	45	29
25	6	9	18	29	51	90	38
31	91	62	-				
Feb 6	35	54	43	Aug 4	69	55	58
12	36	28	16	10	25	-	22
18	31	40	31	16	26	82	28
24	22	86	54	22	41	46	28
				28	81	<u>126</u>	61
Mar 1	31	104	36	Sep 3	32	39	17
7	72	107	81	9	29	46	27
13	41	58	38	15	27	26	24
19	64	<u>165</u>	72	21	12	105	50
25	35	<u>71</u>	63	27	18	33	33
31	57	75	<u>162</u>				
Apr 6	44	40	103	Oct 3	35	53	30
12	27	<u>236</u>	120	9	59	95	56
18	63	<u>117</u>	111	15	44	28	64
24	63	<u>205</u>	104	21	67	61	44
30	8	<u>31</u>	13	27	31	<u>210</u>	28
May 6	29	37	32	Nov 2	43	<u>208</u>	37
12	17	17	36	8	53	<u>79</u>	42
18	<u>179</u>	<u>145</u>	114	14	39	36	<u>175</u>
24	<u>14</u>	<u>69</u>	51	20	76	<u>216</u>	<u>132</u>
30	50	119	63	26	<u>124</u>	<u>35</u>	-
Jun 5	12	68	52	Dec 2	26	-	-
11	53	68	40	8	33	34	33
17	50	58	58	14	<u>135</u>	<u>262</u>	<u>135</u>
23	88	<u>125</u>	59	20	<u>25</u>	<u>21</u>	<u>28</u>
29	33	<u>95</u>	43	26	28	4	28
Annual mean:					38	59	44

^aValues above the 24-hour objective ($120 \mu\text{g}/\text{m}^3$) are underlined.

TABLE 4. Annual geometric means ($\mu\text{g}/\text{m}^3$) of total suspended particulate matter near Thunder Bay Terminals Limited, 1976-1984.

Monitoring site	Location	1976	1977	1978	1979	1980	1981	1982	1983	1984
1	Sewage Treatment Plant	41	31	27	30	28	31	28	27	38
3	Thunder Bay Terminals	47	33	34	33	33	39	32	42	59
10	McKellar Hospital	49	36	44	51	44	52	39	36	44



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